

PART 1 - GENERAL**1.1 Measurement for .1
Payment****Payment for temporary environmental procedures:**

- .1 Payment for the Contractor to implement Temporary Environmental Procedures as directed by the Owner's Environmental Monitor (OEM) and the Departmental Representative (DR) will be at the unit rates tendered in the unit price table and shall include full compensation for all labour, material, and equipment necessary and incidental for the supply, installation, maintenance, and removal for each Temporary Environmental Procedure.
- .2 Measurement for payment for each Temporary Environmental Procedure shall be made by the "unit of measurement" detailed in Table 1 below, measured in place, and accepted by the DR. Overlap to be considered incidental in the payment item.

Table 1 – Temporary Environmental Procedures

Environmental Procedure	Unit of Measurement
Pre-Staked Silt Fence Barrier	Per linear metre supplied, installed and removed
Erosion Control Blanket (C32BD) (all natural & bio-degradable)	Per square metre supplied, installed and removed
Poly or Nylon Sandbags	Per sand bag supplied, installed and removed
Poly Sheeting 6 mil, 3 metres by 50 metres	Per square metre
Rock Check Dams	Per check dam supplied, installed and removed
Orange Safety Fencing, 1.4 metres height	Per linear metre supplied, installed and removed
Small Wetland Filter Bag	Per filter bag supplied, installed and removed
Large Wetland Filter Bag	Per filter bag supplied, installed and removed
50 mm Diameter Trash Pump and 61 m Discharge Hose	Per day supplied, installed and removed
75 mm Diameter Trash Pump and 61 m Discharge Hose	Per day supplied, installed and removed

- .3 The Contractor shall note that the quantities for erosion control blanket in the Temporary Environmental Procedures is in addition to the quantities for permanent erosion control blanket in the Pricing Schedule.
 - .4 Additional payment for this item for quantities exceeding the Contract Quantities in Table 1 above shall be at the unit price provided by the Contractor in the Pricing Schedule for each Temporary Environmental Procedure, supplied, installed, maintained, and removed as measured and accepted by the DR.
 - .5 There will be no consideration for any other additional payment or extension of contract time, for events including but not limited to shut downs due to heavy rain events, breeding bird timing restrictions, amphibian timing restrictions, or other wildlife encounters, for the Contractor other than Items 1.1.1.1 and 1.1.1.3 to implement the Temporary Environmental Procedures or as specified elsewhere in the Contract.
- .2 Payment for invasive species control:
- .1 Payment for this item shall be as described in Section 31 93 02 – Invasive Species Control, Clause 1.2.
- .3 Payment for Standby Equipment and Materials:
- .1 The Contractor is required to provide, store on-site, and maintain the specified quantities for the duration of the contract, the mandatory standby equipment and materials detailed in Table 2 below. Measurement for payment for this item shall be at the Lump Sum price tendered for standby equipment and material. If the equipment and/or materials are required to be implemented, The cost of replacement equipment shall be included in the unit prices tendered for the Temporary Environmental Procedures. Quantities of standby equipment and materials are subject to verification by the DR.
 - .2 The Contractor shall immediately replace, not later than 48 hours, any standby equipment and/or material implemented to maintain the required quantities of mandatory standby equipment and materials stored on-site.

Table 2 – Mandatory Standby Equipment and Materials

Standby Equipment and Materials	Standby Quantity
50 mm Diameter Trash Pump and 61 m Discharge Hose	2
75 mm Diameter Trash Pump and 61 m Discharge Hose	2
Poly or Nylon Sandbags	500
Poly Sheeting 6 mil, 3 metres by 50 metres	450 square metres
Coconut Erosion Control Blanket (C32BD) 3 metres by 50 metres (all natural & bio-degradable)	450 square metres

Standby Equipment and Materials	Standby Quantity
Wooden Stakes, between 0.7 metres and 1.0 metre in length	150
Pre-Staked Silt Fence Barrier	600 metres
Crushed Rock, ϕ 15 cm	5 cubic metres
Pea Gravel	2 cubic metres
Orange Safety Fencing, 1.4 metres height	200 metres
Floating Sorbent Booms 100mm diameter (in addition to those included in spill kits)	60 metres
Large Spill Kit capable of containing 110% of the Volume of Fuel and Fluids in the Contractor's Largest Machinery on-site	2

1.2 Environmental Significance

- .1 The Project is contained within the boundaries of the Pacific Rim National Park Reserve, an area of significant ecological importance. The area is a coastal temperate rainforest, and a protected area of the Clayoquot Sound UNESCO World Biosphere Reserve. The reserve is home to old growth rainforest, dozens of protected species at risk, and highly sensitive ecosystems. The work site is located entirely within sensitive old growth rainforest and spruce fringe ecosystem. Limiting impact beyond the project footprint and protecting remaining trees and tree roots during construction is required.
 - .2 Within the reserve, the precipitation is high, 400 to 500mm per month on average, with the potential for heavy rainfall events, 50 to 100mm in 24 hours. The schedule of works needs to be considered very carefully and work must be staged incrementally to avoid having large areas exposed at one time. There are several springs and a significant amount of overland flow that accumulates at the project location when it is raining. Water management during construction is expected to be a significant effort, and specialized mitigation measures will be required. The water table is perched on the underlying clay and standing water present during the winter months, particularly in the lower part of the slope. Specialized construction techniques and mitigation measures will be required. Temporary slope stability, sediment generation and equipment access will be affected by heavy rainfall events. The contractor should expect to limit work on the slope during (and potentially after) heavy rainfall events
 - .3 There are no watercourses located within the project footprint. However, the roadside ditch along Hwy 4 and the marine shoreline adjacent to the worksite are considered sensitive aquatic habitat and must be protected during construction, especially from the release of sediment and deleterious substances.
 - .4 Due to the complicated and extreme environmental conditions of the Project area, the Contractor will need to factor environmental issues and requirements into all components of the approach to work and schedule and coordinate extensively with the OEM in order to successfully complete this Project.
 - .5 The Contractor shall be in full compliance with the contract environmental procedures, all regulatory approval terms and conditions and all applicable
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environmental legislation at all times throughout the duration of the contract, including during any shutdown periods.

- .6 Where, in the sole discretion of the DR or the OEM, the Contractor is not in full compliance with the contract environmental procedures, legislation or regulatory approval terms and conditions or fails to implement any environmental procedures direction from the DR or the OEM, and the Contractor, following notification from the DR or the OEM of any event of non-compliance, verbally or in writing, fails to immediately without any delay remedy any event of non-compliance, the Owner may terminate this contract upon written notice and the Contractor shall not be entitled to any claim for compensation from any loss or damages including, but not limited to, business losses or loss of profit. This right of the Owner to terminate the contract is in addition to any other Owner rights stipulated elsewhere in the contract.

1.3 Definitions

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare, and/or the ecosystem health and functioning; unfavorable alterations ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally, and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy, and radioactive material as well as other pollutants.
- .3 Invasive plants: are any alien plant species that have the potential to pose undesirable or detrimental impacts on humans, animals or ecosystems. Invasive plants have the capacity to establish quickly and easily on both disturbed and undisturbed sites, and can cause widespread negative economic, social, and environmental impacts.
- .4 Wetland: is a swamp, marsh, or other similar area that supports natural vegetation that is distinct from the adjacent upland areas. More specifically, a Wetland is an area where a water table is at, near, or above the surface or where soils are water-saturated for a sufficient length of time that excess water and resulting low oxygen levels are principal determinants of vegetation and soil development. The Contractor shall rely on the Contract Drawings which delineate Wetland zones and the additional direction of the OEM for the determination of whether any other area is defined as a Wetland.
- .5 Watercourse: a Watercourse shall be defined as a natural or man-made channel from a permanent or periodical natural source, flowing in a particular direction and in a defined channel having a bed and banks or sides and discharging into another stream or body of water. It may sometimes be dry and may also include all highway ditches. The Contractor shall rely on the additional direction of the OEM for the determination of whether any natural or man-made channel or ditch is defined as a Watercourse.
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- .6 Temporary Environmental Procedures: Temporary environmental procedures are limited to those environmental procedures specifically directed by the OEM or the DR for which the Contractor shall be paid on a time and materials basis. Temporary environmental procedures do not include any procedures for which this contract specifies as being incidental to the Work.
 - .7 Riparian Areas: A Riparian Area is the area immediately adjacent to a watercourse, ditch, stream, creek, river, lake or wetland that is connected to fish bearing habitat downstream. Riparian Areas are 30 metres on either side of the Watercourse, ditch, stream, creek, river, lake, or Wetland or 15 metres from the top of a ravine bank on larger ravines. Riparian Areas that have been cleared of vegetation, either fully or partially, under previous contracts are considered to be Riparian Areas.
 - .8 High water line: The maximum limit of a Watercourse as defined by the location of the terrestrial rooted vegetation as detailed in Figure 7 of the “Fish-stream Crossing Guidebook” revised September 2012, published by the BC Ministry of Forests, Lands, and Natural Resource Operations and Ministry of Environment.
 - .9 “Owner’s Environmental Monitor” (OEM) shall mean a representative appointed by PCA for the purpose of execution of the contract.
 - .10 “Environmental Management Plan” (EMP) shall mean the “Environmental Management Plan for ʔapsčiik ʔašii - Going in the Right Direction on the Trail Construction” Draft 1, prepared by Wood PCL and Dated June, 2019. Items contained in the EMP with cost implications are included in these Specifications. The EMP provides background information and details that will explain the Contractor the importance and rational of the environmental works.
- 1.4 Regulatory Overview
- .1 The Contractor shall comply with all applicable environmental laws, regulations and requirements of Federal authorities, and acquire and comply with such permits, approvals and authorizations as may be required.
- 1.5 General
- .1 Due to the significant environmental requirements of this project, the environmental monitoring component will be provided directly by the Owner in the form of an Owner's Environmental Monitor (OEM). The OEM will be onsite at all times during construction and will have the authority under the DR to direct the Contractor with regards to installing, maintaining and removing temporary environmental procedures and ensuring that appropriate installation and maintenance measures are followed. The OEM will also have the authority to shut down construction, especially during heavy rainfall events, or other events that preclude effective environmental mitigation.
 - .2 The Contractor will therefore NOT be required to hire a separate Environmental Monitor for this project, however, they will still be responsible for purchasing and effectively implementing all the mitigation measures described in these Environmental Procedures under the direction of the OEM.
 - .3 It is imperative that the Contractor understands that the environmental procedures are a cooperative effort between the Contractor, the DR and the OEM. Refer to
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Section 01 11 00, General Instructions, Clause 1.41.2, Submission of Tender, for additional information.

- .4 Environmental Procedures shall be a component of the initial contractor orientations for all persons working for the Contractor including sub-contractor's personnel and all daily tailgate meetings.
- .5 The EMP provides additional background information and details that will explain to the Contractor the importance and rational of the environmental works. The EMP should be used as a reference by the Contractor & OEM when additional detail beyond that provided in the Specifications is required. The EMP contains an environmental mapbook which should be used by the Contractor as a scheduling and planning tool to plan work appropriately within sensitive habitats.
- .6 After area is cleared of amphibians, breeding birds or other wildlife, Contractor must work diligently to ensure that work is completed in a timely manner and in a way that does not encourage wildlife to re-enter the work zone
- .7 The Contractor is required to adhere to the requirements of the Environmental Procedures at all times and will be required to keep a copy of the Environmental Procedures Specification on site for reference at all times during construction.
- .8 The Contractor must coordinate with the OEM as to the construction activities and up-to-date schedule so that the requirement for salvage operations and/or pre-clearing surveys can be identified well in advance and environmental specialists can be scheduled to perform the work. A minimum of 10 days notice of work area is required."; "After area is cleared of amphibians, breeding birds or other wildlife, Contractor must work diligently to ensure that work is completed in a timely manner and in a way that does not encourage wildlife to re-enter the work zone.

- 1.6 Wildlife Habitat
- .1 The Contractor will ensure that all staff and all sub-contractors are familiar with the wildlife protection and mitigation requirements and shall receive prior to the start of construction activities wildlife encounter training from a Parks representative in order to develop protocols for dealing with large carnivores (ie., cougars, wolves and bears) encountered within the work site during construction activities. If large carnivores or their habitat, such as bear dens, are noted in the vicinity of the Project, construction activities may need to stop in the area until appropriate setback buffers can be established or the carnivores vacate the area.
 - .2 The Environment Canada migratory bird nesting window for the Northern Pacific Rainforest (Pacific Rim National Park Reserve) is between March 12th and August 17th inclusive. Any tree clearing required during this period must be approved by the DR and the OEM, and preceded by a breeding bird survey by the OEM. All other construction activities (e.g., removal of slash/log piles, grubbing, etc.) during this window will also require a breeding bird activity survey. The Contractor is required to adhere to the PCA Migratory Bird Guidance to maintain compliance with the MBCA.
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- .3 The Contractor shall include in their schedule 10 days advance notice to the OEM to permit the OEM to coordinate bird activity surveys prior to starting the construction activities in each segment of the work. In the event that the OEM identifies an active nest or nesting behavior in an area, construction activities may be delayed, modified or restricted in the vicinity of the nesting area.
 - .4 The Contractor must avoid inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs (ie. incidental take) in accordance with the Migratory Bird Convention Act (MBCA).
 - .5 The Contractor shall conduct all construction activities in a manner that is sensitive to wildlife and wildlife habitat and in accordance with the Canada National Parks Act (CNPA). No feeding, disturbing or harassing of wildlife will occur. If wildlife is encountered, allow birds, mammals, reptiles, and amphibians to passively disperse and contact the OEM for further advice. Do not physically handle wildlife.
 - .6 The Contractor shall notify the OEM and DR of any observations of wildlife or specific wildlife habitats (ie., nests, denning sites, or burrows).
 - .7 Domestic pets (ie., dogs) are not permitted on site.
 - .8 Dromedary Jumping-slug, protected as a Threatened species under SARA, is often associated with old growth habitat present on the Long Beach Escarpment and considered to be suitable habitat for the species. The Contractor is required to make allowances (i.e., reduced work speed) during construction activities for the OEM to visually monitor for animals during the removal of stumps and large woody debris, as per the DJS Management Plan and SARA authorization for the project. The OEM will conduct pre-construction surveys for important habitat features and flag features requiring salvage and observation in advance of the Construction activities along the entire length of trail.
 - .9 In areas where old, rotted stumps (i.e., they were present prior to the onset of the Project), large logs and root wads, debris piles, etc. are found, salvages of this cover habitat itself will be conducted to protect and limit impacts on wildlife species using this type of habitat. Structures to retain include large (>50 cm diameter) rotten stumps, large (> 50 cm diameter, decay class 3-5) logs, and woodpiles. These should be placed away from the construction footprint of the trail but within 10 m of where they were removed. Densities of these retained structures should be at least as high as the original densities along the trail.
- 1.7 Aquatic Habitat .1 Sensitive aquatic habitat on or near the project footprint includes the ditches along Hwy 4, small isolated wetland pockets in the spruce fringe forest at the base of the escarpment, Watercourse 24 (hwy km 13+200) where the Hwy ditch will be re-routed, and the adjacent marine shoreline along Long Beach. None of the wetlands or watercourses in the project footprint are considered fish bearing, however they are to be treated as sensitive aquatic habitat as they may have amphibians or amphibian egg masses in them during the course of construction.
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- .2 Watercourses and wetlands shall not be crossed by machinery at any time unless approved by the OEM. Machinery shall not track over the beach or within 10 m of the marine shoreline at any time.
 - .3 The Contractor shall not dump excavated fill, waste material, or debris in any watercourse or water body.
 - .4 Mitigation measures are required to prevent the release of sediment laden water into watercourses, ditches, wetlands or the marine shoreline. In addition to sediment management, measures should be taken to prevent the accidental release of fuels or hazardous materials into aquatic habitat.
 - .5 Cement-based products including grouts and concrete are lethal to fish, amphibians, and many other aquatic organisms. One litre of concrete wash water or leachate in 1000L of water will kill fish. Raw product or leachate entering a water body will alter water chemistry, making it more basic or alkaline. Environmental mitigation while using concrete materials shall be in compliance with Section 03 30 00 – Cast-in-Place Concrete of the Contract.
 - .6 Water management and the control of runoff water from the escarpment is expected to be a large component of mitigation during construction. Runoff water may need to be diverted and pumped around the worksite, and discharged into a well vegetated forested area at least 30 m away from all aquatic habitat, as approved by the OEM.
 - .7 In water works are not permitted.
- 1.8 Protection of
Trees and Tree Roots
- .1 Retain all large trees (>100 cm diameter at breast height, >35 m height) and veteran crown class & avoid impacts to their roots.
 - .2 Spatially limited rock walls to avoid mature trees & root systems will be implemented on a site by site basis as large tree roots are encountered during trail excavation. These site-specific procedures will be guided by the geotechnical engineer, the OEM, and Parks where required.
 - .3 For trees located next to the trail that are to be retained and whose roots are exposed during topsoil stripping, structural tree roots greater than 5 cm diameter shall be hand excavated to avoid damage to roots and fabric shall be placed over exposed roots.
 - .4 The Contractor must limit activities that result in soil compaction or disturbance around and over tree roots. Heavy equipment must not be operated within the dripline of trees.
 - .5 Additional felling of trees must be approved by the Owner and completed with the OEM on site. Care must be taken to remove only those trees flagged for removal.
 - .6 ~~The Contractor must flag the limits of clearing in the work area prior to beginning clearing activities. Mature trees to be protected must be clearly marked as such. The plan for tree clearing and protection must be reviewed by the OEM and communicated to site staff prior to commencing any clearing activities.~~ Prior to beginning work, the Contractor must flag the limits of the work area. Mature trees to be protected must be clearly marked as such.
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- .7 Should any potential danger trees be identified during construction on the escarpment, the OEM will assess them to confirm whether they are wildlife trees and contain species, nests and/or dens prior to cutting and removal. If trees are deemed to provide wildlife habitat value, individual tree prescriptions may be required to protect the ecological function of the tree.
- 1.9 Amphibian .1 Amphibians and their habitat are widespread within PRNPR and could be present throughout the entire area of the trail works. There are 7 amphibian species that may breed or migrating in the Project area including 3 that are Species At Risk. The timing of amphibian breeding and migrations are known in a broad sense, but the exact onset and ending of each breeding and migratory period varies from year to year and are difficult to predict as they are largely weather dependent. In the summer months, migrations are triggered by rain events following periods of dry weather. Pulses of migrating amphibians could come into direct conflict with machinery and crews during trail paving, putting a relatively large proportion of amphibians at risk.
- Habitat Protection and Salvage
- .2 The Contractor shall ensure that their schedule allows additional time required for the OEM to conduct the required amphibian survey and salvage prior to paving in each segment of the work.
- .3 The Contractor and OEM shall coordinate their efforts to avoid conflicts with the work and to ensure these requirements are met within a timely manner.
- .4 The Contractor shall provide a minimum of ten working days' notice for each 1 km section of trail and work in each environmentally sensitive area (e.g. each Watercourse, Riparian Area and Wetlands) or Amphibian Breeding Habitat and Migration area
- .5 The Contractor shall make allowances (ie. reduced work speed) during construction activities for the OEM to visually monitor for amphibians and other wildlife ahead of paving equipment.
- .6 After an area is cleared of amphibians, the Contractor shall commence work within three days and work diligently to complete the construction activities in a timely manner. Costs of salvage rework will be charged to the Contractor if work is not begun within three days following the completion of amphibian salvage and/or work does not continue at a reasonable rate to complete the work.
- .7 Events beyond the Contractors control such as weather delays that result in areas requiring additional salvage work shall not be charged to the Contractor.
- .8 Any hazardous or toxic products used during paving will be carefully contained to ensure they do not spill and contaminate sensitive habitat. Storage of these products may not occur within 100m of any surface water.
- .9 Prior to construction in a given area, the OEM / salvage crew will search for specific features, such as old stumps logs, and wood piles in order to mark their location via GPS and to flag them. The OEM / salvage crew will communicate with the construction crew when their work will be encountering these features
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and plan for their appropriate removal and salvage of amphibians and other wildlife (e.g., Dromedary Jumping slugs). These habitat features will be lifted slowly and methodically to allow for salvage crews to watch for emerging or exposed amphibians. If amphibians or other wildlife are observed in association with this work (e.g., Dromedary jumping slugs), an individual amphibian or suspected communal hibernacula are exposed), the OEM will stop construction work until all individuals have been removed. The OEM may direct the construction crew to place certain woody structures off to the side of the pathway where they will be retained as habitat.

- .10 When moving large woody debris or other construction materials on site, the Contractor shall employ a 'pick up and place' technique rather than dragging logs or other materials.
- .11 Large/decaying stumps and LWD should be salvaged and remain on site to the greatest extent possible. If this material needs to be removed for any reason, the OEM may direct the Contractor to set aside excavated materials from any excavations in areas for up to 3 hours prior to moving material to the final disposal location to allow for amphibian (and other animal) salvage.
- .12 The Contractor shall make allowances (i.e., reduced work speed) during construction activities for the OEM to visually monitor for animals (e.g., amphibians and slugs) during the removal of stumps and large woody debris (LWD).

1.10 Invasive Plant Management

- .1 Invasive plants are known to occur in the area where the construction works will occur, and preventative measures are needed to limit their spread.
 - .2 All construction vehicles, equipment, machinery, and hand tools shall be inspected and cleaned prior to every entry into the Park Reserve, prior to every exit from the Park Reserve, and prior to every travel to another section (ie., between each access point) of the Project area while in the Park Reserve.
 - .3 All construction staff clothing shall be free of soil and vegetation debris prior to entering the Park Reserve each work day, prior to exiting the Park Reserve each day, and prior to every travel to another section of the Project area while in the Park Reserve. Boots shall be washed of all soil materials.
 - .4 All construction materials brought into the Park Reserve must be free of invasive species. Sources of all materials shall be inspected by the Contractor and OEM and/or DR prior to supply of material to determine if invasive species are present and to formulate a protocol to avoid introducing these into the Park Reserve. This may include washing material prior to use, avoiding contaminated areas, constructing clean haul routes, and finding new, clean sources of materials.
 - .5 Invasive plant removal shall be conducted in every area where construction operations have taken place for 2 years following construction on a monthly basis, both during and after construction should invasive plants be identified by the DR, OEM, or PCA staff. See Section 31 93 02 - Invasive Species Control for details.
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- 1.11 Precipitation
- .1 The Contractor is notified that, within the geographical area of the work, the precipitation is high, 400 to 500mm per month on average between October and April, with the potential for heavy rainfall events, 50 to 100mm in 24 hours, which can occur at any time of the year.
 - .2 For rainfall events, the OEM and the DR may shut down all work activities. No consideration for additional payment will be considered for rainfall event shut-downs. The Contractor shall maintain and repair, if necessary, all environmental protection measures including Temporary Environmental Procedures and those incidental to construction, in addition to any new Temporary Environmental Procedures as directed by the OEM during shutdowns. All environmental protection measures will be inspected by the Contractor and the OEM after each rainfall event of more than 15 mm of rain and in areas prone to flooding or excessive run-off as directed by the OEM. The OEM may direct that additional inspections be conducted where rainfall exceeds 25 mm in any 24-hour period.
 - .3 The Contractor shall ensure that the required number and size of mandatory standby equipment and materials specified in Table 2 are readily accessible on-site to deal with construction activities during high precipitation events.
 - .4 The Contractor must schedule paving to occur during dry weather periods as this allows for easier control of contaminated runoff and sediment. If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants. Extreme rain events may require a work shut-down at the discretion of the OEM.
- 1.12 Soil and Sediment Erosion Control
- .1 Temporary Environmental Procedures must be in compliance with Federal legislation and regulations and direction from the OEM where required. Notwithstanding, Contractors shall reference the provincial MOE “Standards and Best Practices for Instream Works (2004)” for best practices for instream sediment and the provincial Ministry of Forests “Best Management Practices Handbook: Hillslope Restoration in BC (Nov 2001)”. These erosion and sediment control procedures are considered incidental to the Work.
 - .2 The Contractor shall create a sediment and erosion control plan outlining procedures for typical trail construction and typical events (eg., heavy rainfall event). This plan shall be submitted a minimum of ten days prior to work occurring for review by the DR and the OEM. The DR and OEM may request changes to any plan to ensure that proposed methods for sediment and erosion control are satisfactory for each Project site. No additional payment shall be made for environmental protection measures that are incidental to the work.
 - .3 The Contractor shall install, maintain and remove all Temporary Environmental Procedures as directed by the OEM and the DR.
 - .4 Temporary Environmental Procedures, where required by the contract or as directed by the DR and OEM, are to be installed prior to starting any
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construction activities to prevent sediment from entering any waterways.

- .5 Sediment and erosion control measures shall be: a) inspected by Contractor and OEM regularly at a frequency commensurate with the risk, nature, location, and seasonality of the work and adapted or revised, as appropriate; and b) repaired by Contractor as necessary in a timely manner, commensurate with the risk, nature, location, and seasonality of the work, maintained by Contractor until construction is completed, and the affected areas are sufficiently stabilized and revegetated, so there is minimal risk of erosion or sedimentation at the site as a result of construction activities.
- .6 At OEM's direction, Contractor may be responsible for installing and maintaining filter fabric dams, rock check dams, settling ponds, French drains, interception ditches, and silt fencing as needed on a site specific basis to control erosion.
- .7 Excavations and grubbing activities will be stopped during intense rainfall events or whenever surface erosion has the potential to affect a watercourse. Stoppages will be at the discretion of the OEM. Work will not resume until corrective actions have been implemented to the satisfaction of the OEM.

1.13 Drainage and Wastewater Discharge

- .1 The Contractor shall provide temporary drainage as necessary to keep excavations and site free from water. The Contractor shall submit a dewatering plan for each project site where dewatering is incidental to the work a minimum of ten days prior to work occurring for review by the DR and the OEM. The DR and OEM may request changes to any plan to ensure that proposed methods for dewatering are satisfactory for each Project site. No additional payment shall be made for dewatering that is incidental to the work.
- .2 The Contractor shall not discharge water containing suspended materials into Watercourses, Riparian Areas, Wetlands, amphibian habitat, sanitary sewer or drainage systems.
- .3 Any water discharged or rainfall runoff from the site that flows into the environment (e.g., waterbody, watercourse, drain, ditch, or ground) must comply with BC Working Water Quality Guidelines and the BC Approved Water Quality Guidelines. The OEM is responsible for conducting all water quality sampling and analysis to determine its chemical composition. Contractor will be responsible for any corrective action deemed necessary by OEM.
- .4 Excavations and grubbing activities will be stopped during intense rainfall events or whenever surface erosion has the potential to affect a watercourse. Stoppages will be at the discretion of the OEM. Work will not resume until corrective actions have been implemented to the satisfaction of the OEM

1.14 Pollution Control

- .1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, Wetlands, water bodies or Watercourses that would result in damage to aquatic and Riparian Areas. Hazardous or toxic products, including concrete wash water, shall be stored no closer than 100 metres to any surface water.
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- .2 The Contractor shall prevent blowing dust and debris by providing dust suppression for on-site work. Water is the only allowable dust suppression measure.
 - .3 The Contractor shall provide industry standard spill kits, to the satisfaction of the DR and OEM, at all work sites refueling, lubrication and repair locations that are capable of containing 110% of the largest potential spill and shall be maintained in good working order on the construction site. All mobile equipment shall carry a smaller spill kit at all times. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.
 - .4 The Contractor shall take timely and effective actions to stop, contain and clean-up all spills until the spill site is deemed to be remediated and safe to re-enter by the DR. The Owner, OEM and DR shall be notified immediately of any spill.
 - .5 In the event of a spill, the Contractor shall prioritize the clean-up and all other work shall be stopped, where appropriate, and Contractor personnel shall be devoted to spill containment and clean up.
 - .6 The costs involved in a spill incident (control, wildlife salvage, clean up, disposal of contaminants, and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the pre-spill condition to the satisfaction of the DR.
 - .7 Ensure hazardous or toxic products, equipment, and fuel are stored no closer than 100 m from streams, wetlands, waterbodies, or wetted areas. Spoil and stockpiles should be no less than 50 m from these features.
- 1.15 Equipment, Maintenance, and Fueling
- .1 The Contractor shall ensure that equipment and machinery are in good operating condition, clean (power washed), free of leaks, excess oil, and grease. Ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working condition.
 - .2 Hydraulic machinery shall use environmentally sensitive hydraulic fluids that are non-toxic to aquatic life and that are readily or inherently biodegradable.
 - .3 Equipment fueling sites will be identified by the Contractor to the satisfaction of the DR. On site storage of fuel shall not be allowed in any area other than those areas approved by the DR.
 - .4 Mobile fuel containers (ie., slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Where fuel or other fluid containers are out of the service vehicle for use, all containers must be situated on drip trays and returned to the service vehicle immediately following use.
 - .5 The Contractor shall not refuel or service equipment within 50m of any watercourse, riparian area, wetland, or surface water drainage.
 - .6 Equipment used on the Project shall be fueled with E10, and low Sulphur diesel fuels where available and shall conform to local emission requirements. The Contractor is to ensure that unnecessary idling of the vehicles is avoided.
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- .7 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at only those locations satisfactory to the DR. Waste lubrication product (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas, viewpoints, etc. or anywhere within the work area.
 - .8 Fuel containers and lubricant products shall be stored only in secure locations to the satisfaction of the DR. Fuel tanks or other potential deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals when left overnight. Alternatively, the Contractor may hire a security person employed to prevent vandalism.
 - .9 Place drip trays, plastic sheets or absorbent pads underneath vehicles and equipment that are not in use and left on site overnight to capture any drips or leaks that may occur. Secondary equipment is to be covered with a tarp, equipped with a roof, or with a "rain-drain" or equivalent hydrocarbon filter
 - .10 Ensure that fuel/oil storage containers are not placed within 50 m of any watercourse.
 - .11 Do not store machinery within the drip line of trees.
 - .12 Limit activities that result in compaction around and over tree roots. Heavy equipment shall not be operated within the dripline of trees.
- 1.16 Operation of Equipment
- .1 Equipment movements shall be restricted to the "footprint" of the construction area cleared.
 - .2 When, in the opinion of the DR, negligence on the part of the Contractor results in damage or destruction of vegetation, natural hydrology (e.g., altering direction or rate of flow, ponding, etc.) or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible for all costs to complete restoration work including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the DR.
 - .3 The Contractor shall restrict vehicle movements to the work limits.
 - .4 Notify the OEM of any observations of denning sites or burrows at the Project site.
 - .5 Minimize the use and ensure proper storage of potential wildlife attractants such as food, garbage,
 - .6 Limit construction activities to the time between dawn and dusk to avoid the illumination of adjacent habitat. Artificial lighting must never be used within or near amphibian habitat. If construction timing restrictions are not possible and artificial lighting must be used outside of sensitive habitats:
 - Use down shielding or directional lighting to avoid light trespass into bird habitat.
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- To the extent practicable, use low intensity energy saving lighting and consider the use of motion or heat sensors to minimize illumination.
 - Avoid the use of bright white light, such as metal halide, halogen, fluorescent, mercury vapour and incandescent lamps."
- .7 Equipment shall only be operated or stored within existing disturbed footprint. Contractor shall only access project areas using existing access points. Operation of equipment is strictly prohibited in Wetlands and Watercourses.
- .8 Minimize engine idling.
- .9 Ensure that all equipment is maintained in good working order and has properly functioning emission controls.
- .10 Ensure that all equipment has properly functioning noise control equipment (e.g., mufflers) designed for the equipment being operated.
- 1.17 Fire Prevention and Control
- .1 A fire extinguisher shall be carried and available for use on every piece of construction equipment and in every Contractor vehicle.
- .2 Construction equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .3 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The DR shall be notified of any fire immediately as well as the applicable Provincial and Federal Authorities and the local municipal Fire Department. Basic instruction and phone numbers will be provided on-site by the Contractor and will be discussed in the Project start-up meeting.
- .4 Fires or burning of waste materials is not permitted.
- .5 Smoking within the construction area is not permitted.
- .6 The Contractor shall obey all Parks Canada Fire Restrictions in effect throughout the duration of the contract.
- 1.18 Waste Materials Storage and Removal
- .1 The Contractor and workers shall dispose of hazardous wastes in conformance with the applicable federal and provincial regulations.
- .2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.
- .3 Do not pile waste that is to be removed in those areas listed in Clause 1.9.1 – Table 4 as they will rapidly become inhabited by amphibians and other wildlife.
- .4 All food wastes shall be deposited in bear-proof containers and removed daily.
- .5 Construction, trade, hazardous waste and domestic waste materials shall be contained and removed and disposed of at an appropriate off-site waste landfill.
- .6 A concerted effort shall be made by the Contractor and workers to reduce, reuse and recycle materials where possible.
- .7 Sanitary facilities, such as portable container toilets, shall be provided by the Contractor and maintained in a clean condition.
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- 1.19 Wastewater Discharge Criteria
- .1 The Contractor must ensure that the work area is isolated from any flowing water and divert the clean water around the worksite so that no silt-laden or wash water is generated.
 - .2 Wash water and sediment-laden discharge water will be released onto the ground at a location that is outside of, and at least 50m away from, Wetlands, Watercourses and Riparian Areas and only with the approval of the OEM."
 - .3 Any water discharged, water used for dust control, or rainfall runoff from the Project area that flows into the environment (e.g., waterbody, Watercourse, Wetland, drain, ditch, or ground) must comply with BC Working Water Quality Guidelines and the BC Approved Water Quality Guidelines. The OEM is responsible for conducting all water quality sampling and analysis to determine its chemical composition. Contractor will be responsible for any corrective action deemed necessary by OEM.
 - .4 Water contaminated in the placing of cement and curing of concrete (see Section 03 30 00 – Cast-in-place concrete, of this specification) shall be contained and removed from the site to an approved disposal facility. The storage of any waste water from these activities must occur at least 50m from wetlands, watercourses, and other sensitive habitats
- 1.20 Environment Protection Supplies
- .1 The Contractor shall supply, transport, install and maintain all equipment and supplies relating to erosion, sediment and drainage controls necessary to complete the Work as directed by the OEM, the DR.
 - .2 The Contractor shall provide an inventory of environmental protection supplies, listed in Tables 1 and 2, prior to mobilization and in each weekly report to be submitted to the DR.
- 1.21 Access Points
1. Contractor shall only access project areas using existing access points. No new access points will be constructed as part of the paving scope of work.

PART 2 – PRODUCTS

- 2.1 Material
- .1 Erosion Control Blanket (ECB):
Refer to Section 31 32 19 – Geotextiles, Clause 2.1.8 – Erosion Control Blanket.
 - .2 Pre-Staked Silt Fence Barrier:
 - .1 Refer to Section 31 32 19 – Geotextiles, Clause 2.1.9 Pre-Staked Silt Fence Barrier.
 - .3 Sandbags:
Sandbags shall be approximately 350mm X 650mm when flat and when filled with material be approximately 150mm thick. Bags up to 10% smaller or any percentage larger are acceptable.

PART 3 – EXECUTION

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| 3.1 Installation of Erosion Control Blankets | .1 | Refer to Section 31 32 19 – Geotextiles, Clause 3.3 – Installation of Erosion Control Blanket. |
| 3.2 Installation of Pre-Staked Silt Fence Barrier | .1 | Refer to Section 31 32 19 – Geotextiles, Clause 3.3 – Installation of Pre-Staked Silt Fence Barrier. |
| 3.3 Maintenance | .1 | Items installed as a part of the Temporary Environmental Procedures shall be inspected by the Contractor on a weekly basis, during each significant rainfall event, or as directed by the OEM or DR and make repairs to the installations to bring them to a 'like new' condition. |
| | .2 | Those items installed as a part of the Temporary Environmental Procedures that require regular cleaning shall be cleaned at intervals as directed by the OEM or DR. |
| | .3 | Items installed as Temporary Environmental Procedures shall be removed upon completion of the project or as directed by the OEM or DR. Obtain approval of OEM prior to removal. |
| 3.4 Site Restoration | .1 | During clearing, grubbing, and stripping works, the contractor must set aside and store all of the native organics that are stripped from the site, and many of the large stumps and logs to be re-used during site remediation. These items can be stored on site, space permitting, or can be temporarily stored at the High Point storage area within the park (within 5 km of the project site). |
| | .2 | Note that planting benches are to be created on final slopes as shown on Environmental drawings as approved by the OEM and DR. |
| | .3 | All cut and fill slopes, as well as all trail shoulders are to be covered in minimum 15 cm of native organics, with C32BD Erosion Control Blankets (ECB) installed over top. ECB shall be secured with hooked rebar "pins". The areas where ECB are required are shown on the environmental drawings and as directed by the Geotechnical Engineer and OEM. |
| | .4 | Large woody debris (stumps, logs, etc.) salvaged from the site during grubbing/stripping are to be placed on top of the ECB, as directed by the Geotechnical Engineer and OEM. |
| | .5 | Depending on the reach of machinery, this slope remediation may need to be done incrementally. The contractor must plan the work stages accordingly to ensure this final step of slope remediation can be completed as intended. |
| | .6 | All areas of soil disruption and pathway rutting, or compaction must be promptly repaired and reclaimed as directed by the OEM. Compacted soils must be rehabilitated similar to the productive capacity of the area. Any sub-grade repairs or restoration being performed in the support zone of the trail, retaining walls and finished slopes shall be approved by the Owner's Geotechnical Engineer. |

END OF SECTION
